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| 10/735,240 | 12/11/2003 | Michael A. Fetcenko | HS-126 | 2800 |

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| EXAMINER | |
|---|---|
| ROE, JESSEE RANDALL | |
| **ART UNIT** | **PAPER NUMBER** |
| 1742 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/735,240 | FETCENKO ET AL. | |
| | Examiner | Art Unit | |
| | Jessee Roe | 1742 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-9 and 13-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 13-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Status of the Claims*

Claims 1-9 and 13-22 are pending wherein claim 1 is amended and claims 10-12 are canceled.

### *Continued Examination Under 37 CFR 1.114*

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 May 2007 has been entered.

### *Status of Previous Rejections*

The previous rejection of claims 1-2, 5, and 13-22 under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (Hydrogen storage properties in nano-structured magnesium- and carbon-related materials) is withdrawn in view of the Applicant's arguments. The previous rejection of claims 1, 3-9, 13-15 and 17-22 under 35 U.S.C. 103(a) as being unpatentable over Oelerich et al. (Metal oxides as catalysts for improved hydrogen sorption in nanocrystalline Mg-based materials) is withdrawn in view of the Applicant's arguments.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, it is unclear whether the Applicant is claiming magnesium or a magnesium-containing alloy by the use of the phrase "a magnesium or magnesium-based hydrogen storage alloy" and "...wherein said hydrogen desorption catalyst is insoluble in said magnesium or magnesium-based hydrogen storage alloy...". Further, if the Applicant is intending to claim a magnesium-containing alloy, then "said magnesium" would not have antecedent basis in claim 1.

Claims 2-9 and 13-22 are rejected under 35 U.S.C.112, second paragraph, as being indefinite because they depend from a rejected base claim.

### *Examiner Interpretation*

In light of indefiniteness of claim 1 as stated above, the Examiner has interpreted the claims as encompassing magnesium storage material and magnesium-base alloy storage material.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Hjort et al. (Hydrogen sorption kinetics in partly oxidized Mg films).

In regards to claims 1-2 and 13, Hjort et al. disclose wherein a magnesium storage material in bulk (pg. 74, cols. 1-2). The magnesium used would be 99.99% pure magnesium (pg. 75, col. 2). A uniform, continuous palladium film covering the whole surface would be deposited on the magnesium (pg. 77, col. 1 and Fig. 1).

Claims 14-15 and 17-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hjort et al. (Hydrogen sorption kinetics in partly oxidized Mg films).

In regards to claims 14-15 and 17-22, the Examiner asserts that although the limitations of the claimed are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. The Examiner asserts that the product of claims 14-15 and 17-22 are the same as the product of Hjort et al. because the scope of the product of Hjort et al. comprises a continuous or semi-continuous layer of catalytic material on the surface of the magnesium hydrogen storage alloy which is in particulate form. See MPEP 2113.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 4-5, 13-15 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welter et al. (US 4,613,362).

In regards to claims 1, 4 and 13, Welter et al. ('362) disclose a magnesium-based granulate with iron homogenously distributed over the surface of the granulate particles. Although Welter et al. ('362) do not specify the degree (continuous or semi-continuous) to which the iron particles would be distributed on the surface, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the distribution (by using more or less iron) to achieve the desired catalytic effect because Welter et al. disclose a homogeneous distribution (col. 4, lines 20-36). See MPEP 2144.05 II.

In regards to claim 2, Welter et al. ('362) disclose wherein the maximum quantity of iron would be at most 20 weight percent (about 9.8 atomic percent). Therefore, the minimum amount of magnesium would be 80 weight percent (about 90.2 atomic percent).

In regards to claim 5, Welter et al. ('362) disclose using steel instead of iron (col. 4, lines 37-43). Carbon would inherently be present in steel.

In regards to claims 14-15 and 17-22, the Examiner asserts that although the limitations of the claimed are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. The Examiner asserts that the product of claims 14-15 and 17-22 are the same as the product of Welter et al. ('362) because the scope of the product of Welter et al. ('362) comprises a continuous or semi-continuous layer of catalytic material on the surface of the magnesium hydrogen storage alloy which is in particulate form. See MPEP 2113.

Claims 1, 4-9, 13-15 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al. (Preparation and hydriding/dehydriding properties of mechanically milled Mg-30wt% $TiMn_{1.5}$ composite).

In regards to claims 1, 4-6, and 13, Hu et al. disclose adding $TiMn_{1.5}$ or TiFe to a Mg based powder and milling then dispersing $TiMn_{1.5}$ uniformly on the surface (pg. 297 cols. 1-2). The Examiner asserts that milling would result in discrete dispersed catalytic material in the magnesium-based composite. Although Hu et al. do not specify the degree (i.e. continuous or semi-continuous) to which the $TiMn_{1.5}$ particles would be distributed on the surface, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the distribution (by using more or less $TiMn_{1.5}$) to achieve the desired quantity of sorption/desorption sites because Hu et al. disclose a uniform distribution (pg. 301, col. 1). See MPEP 2144.05 II.

In regards to claims 7-9, 14-15 and 17-22, the Examiner asserts that although the limitations of the claimed are limited by and defined by the process, determination of

patentability is based on the product itself. The patentability of a product does not depend on its method of production. The Examiner asserts that the product of claims 7-9, 14-15 and 17-22 are the same as the product of Hu et al. because the scope of the product of Hu et al. comprises a continuous or semi-continuous layer of catalytic material on the surface of the magnesium hydrogen storage alloy which is in particulate form. See MPEP 2113.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hjort et al. (Hydrogen sorption kinetics in partly oxidized Mg films).

In regards to claim 16, Hjort et al. disclose wherein a palladium film would be deposited on the magnesium and would have a thickness of 5-7 nm (50-70 Angstroms) (pg. 77, col. 1). This thickness would be sufficient to give a uniform film covering the whole surface (continuous or semi-continuous layer) (pg. 77, col. 1). The $MgO_x$ layer would have a thickness of about 30 Angstroms and would aid in the hydrogen uptake. Therefore, the thickness of the entire catalytic material would be about 100 Angstroms (abstract and pg. 77, col. 1).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Welter et al. (US 4,613,362), and further in view of Sapru et al. (US 5,976,276).

In regards to claim 3, Welter et al. ('362) disclose a magnesium-based storage material as shown above, but Welter et al. ('362) do not specify wherein the magnesium-based storage material would include aluminum.

In the same field of endeavor, Sapru et al. ('276) disclose doping or alloying magnesium with aluminum in order to improve reaction kinetics during hydrogen

storage (col. 3, lines 1-22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the magnesium-based storage material, as disclosed by Welter et al. ('362), by doping or alloying the magnesium-based storage material with aluminum, as disclosed by Sapru et al. ('276), in order to improve the reaction kinetics during hydrogen storage, as disclosed by Sapru et al. ('276) (col. 3, lines 1-22).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hu et al. (Preparation and hydriding/dehydriding properties of mechanically milled Mg-30wt% $TiMn_{1.5}$ composite), and further in view of Sapru et al. (US 5,976,276).

In regards to claim 3, Hu et al. disclose a magnesium-based storage material as shown above, but Hu et al. do not specify wherein the magnesium-based storage material would include aluminum.

In the same field of endeavor, Sapru et al. ('276) disclose doping or alloying magnesium with aluminum in order to improve reaction kinetics during hydrogen storage (col. 3, lines 1-22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the magnesium-based storage material, as disclosed by Hu et al., by doping or alloying the magnesium-based storage material with aluminum, as disclosed by Sapru et al. ('276), in order to improve the reaction kinetics during hydrogen storage, as disclosed by Sapru et al. ('276) (col. 3, lines 1-22).

### *Response to Arguments*

Applicant's arguments with respect to claims 1-9 and 13-22 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JR

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